

REMARKS

Applicant respectfully requests further examination and reconsideration in view of the the comments set forth fully below. Claims 1-43 were pending. Within the Office Action, claims 1-6, 13-15, 17-22, 29-32, 39-41 and 43 have been rejected, and claims 7-12, 16, 23-28, 33-38 and 42 have been objected to. Claims 1-43 are now pending.

Information Disclosure Statements

As a preliminary matter, the Applicant has enclosed six (6) Form PTO-1449s corresponding to each of the information disclosure statements filed in this matter on May 10, 2001, June 12, 2001, September 27, 2001, January 4, 2002, January 27, 2004, March 10, 2004, and June 25, 2004, respectively. To date, the Applicant has not received initialed copies of these forms from the Examiner. The Applicant respectfully requests that the Examiner consider these information disclosure statements and return the enclosed forms with his initials.

Rejections Under 35 U.S.C. § 103

Within the Office Action, claims 1-4, 13-15, 17-20, 29, 30, 39, 40 and 43 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over figure 1 admitted as the prior art by Applicant (hereinafter "background") in view of U.S. Patent No. 5,633,896 to Carlin (hereinafter "Carlin").

Specifically, it is stated within the Office Action that the background shows: "Block 10 for receiving input; Block 20 for mixing the input; Block 40 for filtering the input; Block 60 for standing a monostable to output a pulse for each cycle; and Block 70 for filtering the modulation components thereby recovering the desired audio frequency. Figure 1 (the background) differs from the instant claimed invention that it does not show the steps of shifting the signal and summing at the end for combining the outputs. However, Carlin discloses (figure 4): the mixer (180) for shifting and separating the input signal to I and Q signals (column 4, lines 9-11); Adder (192) for summing the outputs from I channel (188) and Q channel (190).

"Therefore, it would have been obvious to one of ordinary skill in the art at the time of the invention was made to combine figure 1 and Carlin et al. as providing the requirements of the instant claimed invention for demodulating an input signal using a plurality of monostables." The Applicant respectfully disagrees with this rejection. The background teaches a superhet receiver including an amplifier 10, an L.O. Input Mixer 20 and an IF Filter 40 configured to receive an RF Input. The superhet receiver is coupled, through an appropriate AC coupling, to

an IF Limiter 50, which is coupled to a pulse count demodulator, which includes a monostable 60 and a data filter [Present Application, pg. 1, line 15 - page 3, line 8].

As recognized by the Office Action, the background does not teach the feature of the summing circuit coupled to each of the output pulses for combining the output pulses into a composite waveform and outputting the composite waveform and shifting the signal. Furthermore, the background does not teach a superhet receiver for outputting an in-phase signal and one or more phase shifted signals, nor does the background teach a plurality of monostables for receiving the in-phase signal and one or more phase shifted signals.

Carlin teaches a demodulation technique which minimizes undesired crosstalk between the analog signal and the digital signals in an AM compatible digital audio broadcasting (AM DAB) system using orthogonal frequency division multiplexed (OFDM) modulation format, by employing dual fast Fourier transform processes on separate respective in-phase and quadrature-phase components of a received OFDM digital signal. The output of the quadrature channel is used to recover the complimentary data, and the resultant processed component signals are summed to recover the non-complementary data. Carlin does not teach a monostable or a plurality of monostables for receiving the in-phase signal and one or more phase shifted signals, wherein each monostable produces an output pulse. Carlin also does not teach a summing circuit coupled to each of the monostable output pulses for combining the monostable output pulses into a composite waveform and outputting the composite waveform. Carlin also does not teach a filtering circuit for receiving the composite waveform, recovering a modulated signal and outputting the modulated signal. Accordingly, neither the background, Carlin nor their combination teach the features of the superhet receiver, the plurality of monostables or the summing circuit coupled to the plurality of monostables.

Further, there is no teaching, suggestion, or motivation to combine the references. The background teaches a superhet receiver including, inter alia, an IF filter configured to receive an RF input, and an IF limiter coupled to a monostable. Combination of the dual FFT processors in Carlin with the superhet receiver of the background would destroy phase information. Further, combination of the high pass filters in Carlin with the superhet receiver of the background would destroy information on the in-phase signal and the phase-shifted IF signals. There is simply no motivation to combine the low IF FM demodulator of the background with the AM DAB system of Carlin.

In contrast to the teachings of the background, Carlin and their combination, the superhet receiver of the present invention comprises a quadrature IF and improved demodulator and is configured to recover a modulated signal from a low IF in a radio receiver. The superhet receiver

receives a FM radio-frequency signal, converts the input RF signal to an in-phase IF signal and an IF signal in phase quadrature to the in-phase signal, and output the IF signals. A plurality of monostables receive the IF signals and each monostable generates a corresponding output pulse. By combining the monostable output pulses, a complex waveform is generated. The complex waveform includes the demodulated signal and a carrier signal at a significantly higher IF. The complex waveform is filtered to recover the desired modulated signal. As described above, neither the background, Carlin nor their combination teach the feature of the superhet receiver, the plurality of monostables or the summing circuit coupled to the monostables as described and claimed.

The independent claim 1 is directed to an apparatus for receiving an input signal and outputting a recovered modulated signal comprising a superhet receiver for receiving the input signal and for outputting an in-phase signal and one or more phase shifted signals, a plurality of monostables for receiving the in-phase signal and one or more phase shifted signals, each monostable producing an output pulse, a summing circuit coupled to each of the monostable output pulses for combining the monostable output pulses into a composite waveform and outputting the composite waveform and a filtering circuit for receiving the composite waveform, recovering a modulated signal and outputting the modulated signal. As described above, neither the background, Carlin nor their combination teach the features of a plurality of monostables for receiving the in-phase signal and one or more phase shifted signals, each monostable producing an output pulse, a summing circuit coupled to each of the monostable output pulses for combining the monostable output pulses into a composite waveform and outputting the composite waveform. For at least these reasons, the independent claim 1 is allowable over the teachings of the background, Carlin and their combination.

Claims 2-4 are all dependent on the independent claim 1. As discussed above, the independent claim 1 is allowable over the teachings of the background, Carlin and their combination. Accordingly, the dependent claims 2-4 are all also allowable as being dependent on an allowable base claim.

The independent claim 13 is directed to a method of demodulating an FM signal using a superhet receiver and a demodulator comprising applying an input signal to a superhet receiver for generating an in-phase signal and one or more phase shifted signals, providing the in-phase signal and the one or more phase shifted signals to a plurality of monostables for generating a plurality of generated output pulses, summing the plurality of generated output pulses from each of the plurality of monostables in a summing circuit for forming a composite waveform and filtering the composite waveform from the summing circuit in a filtering circuit for outputting a

modulated signal therefrom. As described above, neither the background, Carlin nor their combination teach the features of providing the in-phase signal and the one or more phase shifted signals to a plurality of monostables for generating a plurality of generated output pulses and summing the plurality of generated output pulses from each of the plurality of monostables in a summing circuit for forming a composite waveform. For at least these reasons, the independent claim 13 is allowable over the teachings of the background, Carlin and their combination.

Claims 14 and 15 are all dependent on the independent claim 13. As discussed above, the independent claim 13 is allowable over the teachings of the background, Carlin and their combination. Accordingly, the dependent claims 14 and 15 are all also allowable as being dependent on an allowable base claim.

The independent claim 17 is directed to an apparatus for receiving an input signal and outputting a recovered modulated signal comprising means for applying an input signal to a superhet receiver for generating an in-phase signal and one or more phase shifted signals, means for providing the in-phase signal and the one or more phase shifted signals to a plurality of monostables for generating a plurality of generated output pulses, means for summing the plurality of generated output pulses from each of the plurality of monostables in a summing circuit for forming a composite waveform and means for filtering the composite waveform from the summing circuit in a filtering circuit for outputting a modulated signal therefrom. As described above, neither the background, Carlin nor their combination teach the means for providing the in-phase signal and the one or more phase shifted signals to a plurality of monostables for generating a plurality of generated output pulses and means for summing the plurality of generated output pulses from each of the plurality of monostables in a summing circuit for forming a composite waveform. For at least these reasons, the independent claim 17 is allowable over the teachings of the background, Carlin and their combination.

Claims 18-20 are all dependent on the independent claim 17. As discussed above, the independent claim 17 is allowable over the teachings of the background, Carlin and their combination. Accordingly, the dependent claims 18-20 are all also allowable as being dependent on an allowable base claim.

The independent claim 29 is directed to an apparatus for receiving an input signal and outputting a recovered modulated signal comprising a superhet receiver for receiving the input signal and for outputting an in-phase signal and one or more phase shifted signals, a plurality of monostables for receiving the superhet receiver output signals, the monostables configured into pairs whereby the number of monostable pairs is equal to the number of output signals from the superhet receiver, and each monostable producing an output pulse, a summing circuit coupled to

each of the monostable output pulses for combining the monostable output pulses into a composite waveform and outputting the composite waveform and a filtering circuit for receiving the composite waveform, recovering a modulated signal and outputting the modulated signal. As described above, neither the background, Carlin nor their combination teach the features of a plurality of monostables for receiving the superhet receiver output signals, the monostables configured into pairs whereby the number of monostable pairs is equal to the number of output signals from the superhet receiver, and each monostable producing an output pulse, a summing circuit coupled to each of the monostable output pulses for combining the monostable output pulses into a composite waveform and outputting the composite waveform. For at least these reasons, the independent claim 29 is allowable over the teachings of the background, Carlin and their combination.

Claim 30 is dependent on the independent claim 29. As discussed above, the independent claim 29 is allowable over the teachings of the background, Carlin and their combination. Accordingly, the dependent claim 30 is also allowable as being dependent on an allowable base claim.

The independent claim 39 is directed to an apparatus for receiving an input signal and outputting a recovered modulated signal comprising a superhet receiver for receiving the input signal and for outputting an in-phase signal and a signal in phase-quadrature to the in-phase signal, a plurality of monostables for receiving the in-phase signal and the signal in phase-quadrature, the monostables configured into pairs wherein a first monostable pair receives the in-phase signal and a second monostable pair receives the signal in phase-quadrature, and further wherein each monostable produces an output pulse, a summing circuit coupled to each of the monostable output pulses for combining the monostable output pulses into a composite waveform and outputting the composite waveform and a filtering circuit for receiving the composite waveform, recovering a modulated signal and outputting the modulated signal. As described above, neither the background, Carlin nor their combination teach the features of a superhet receiver for receiving the input signal and for outputting an in-phase signal and a signal in phase-quadrature to the in-phase signal, a plurality of monostables for receiving the in-phase signal and the signal in phase-quadrature, the monostables configured into pairs wherein a first monostable pair receives the in-phase signal and a second monostable pair receives the signal in phase-quadrature, and further wherein each monostable produces an output pulse and a summing circuit coupled to each of the monostable output pulses for combining the monostable output pulses into a composite waveform and outputting the composite waveform. For at least these

reasons, the independent claim 39 is allowable over the teachings of the background, Carlin and their combination.

Claim 40 is dependent on the independent claim 39. As discussed above, the independent claim 39 is allowable over the teachings of the background, Carlin and their combination. Accordingly, the dependent claim 40 is also allowable as being dependent on an allowable base claim.

The independent claim 43 is directed to a method of demodulating an FM signal using a superhet receiver and a demodulator comprising applying an input signal to a superhet receiver for generating an in-phase signal and a signal in phase-quadrature to the in-phase signal, providing the in-phase signal and the signal in phase-quadrature to a plurality of monostables, the monostables configured into pairs wherein a first monostable pair receives the in-phase signal and a second monostable pair receives the signal in phase-quadrature, and further wherein each monostable produces an output pulse, summing the plurality of generated output pulses from each of the plurality of monostables in a summing circuit for forming a composite waveform and filtering the composite waveform from the summing circuit in a filtering circuit for outputting a modulated signal therefrom. As described above, neither the background, Carlin nor their combination teach the features of providing the in-phase signal and the signal in phase-quadrature to a plurality of monostables, the monostables configured into pairs wherein a first monostable pair receives the in-phase signal and a second monostable pair receives the signal in phase-quadrature, and further wherein each monostable produces an output pulse and summing the plurality of generated output pulses from each of the plurality of monostables in a summing circuit for forming a composite waveform. For at least these reasons, the independent claim 43 is allowable over the teachings of the background, Carlin, and their combination.

Within the Office Action, claims 5, 6, 21, 22, 31, 32, and 41 have been rejected under 35 U.S.C. § 103(a) as being unpatentable over the background in view of Carlin, and further in view of U.S. Patent No. 6,275,101 to Underhill. The Applicant respectfully disagrees with this rejection.

Claims 5 and 6 are all dependent on the independent claim 1. As discussed above, the independent claim 1 is allowable over the teachings of the background, Carlin and their combination. Accordingly, the dependent claims 5 and 6 are all also allowable as being dependent on an allowable base claim.

Claims 21 and 22 are all dependent on the independent claim 17. As discussed above, the independent claim 17 is allowable over the teachings of the background, Carlin and their

combination. Accordingly, the dependent claims 21 and 22 are all also allowable as being dependent on an allowable base claim.

Claims 31 and 32 are all dependent on the independent claim 29. As discussed above, the independent claim 29 is allowable over the teachings of the background, Carlin and their combination. Accordingly, the dependent claims 31 and 32 are all also allowable as being dependent on an allowable base claim.

Claim 41 is dependent on the independent claim 39. As discussed above, the independent claim 39 is allowable over the teachings of the background, Carlin and their combination. Accordingly, the dependent claim 41 is also allowable as being dependent on an allowable base claim.

Allowable Subject Matter

Within the Office Action, claims 7-12, 16, 23-28, 33-38 and 42 have been objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 7-12 are all dependent on the independent claim 1. As discussed above, the independent claim 1 is allowable over the teachings of the background, Carlin and their combination. Accordingly, the dependent claims 7-12 are all also allowable as being dependent on an allowable base claim.

Claim 16 is dependent on the independent claim 13. As discussed above, the independent claim 13 is allowable over the teachings of the background, Carlin and their combination. Accordingly, the dependent claim 16 is also allowable as being dependent on an allowable base claim.

Claims 23-28 are all dependent on the independent claim 17. As discussed above, the independent claim 17 is allowable over the teachings of the background, Carlin and their combination. Accordingly, the dependent claims 23-28 are all also allowable as being dependent on an allowable base claim.

Claims 33-38 are all dependent on the independent claim 29. As discussed above, the independent claim 29 is allowable over the teachings of the background, Carlin and their combination. Accordingly, the dependent claims 33-38 are all also allowable as being dependent on an allowable base claim.

Claim 42 is dependent on the independent claim 39. As discussed above, the independent claim 39 is allowable over the teachings of the background, Carlin and their combination.

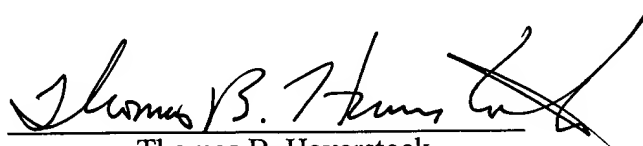
Accordingly, the dependent claim 42 is also allowable as being dependent on an allowable base claim.

For the reasons given above, Applicant respectfully submits that the claims 1-43 are now in a condition for allowance, and allowance at an early date would be appreciated. Should the Examiner have any questions or comments, they are encouraged to call the undersigned at (408) 530-9700 to discuss the same so that any outstanding issues can be expeditiously resolved.

Respectfully submitted,
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Dated: 1-5-05

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CERTIFICATE OF MAILING (37 CFR§ 1.8(a))

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